Performance Analysis Of Seamless Vertical Handover In 4G Networks

Izzeldin I. Mohamed[a], Amran A. Hadi[a], Md R. Othman[a], A. Oudah[b]
[a]Faculty of Electrical and Electronics Engineering, Universiti Malaysia Pahang
[b]Faculty of Manufacturing Engineering, Universiti Malaysia Pahang

ABSTRACT
The current extraordinary growth of wireless technology promises an even greater effect on how people communicate, interact and enjoy their entertainment. The growing advances in research and development of wireless communication technologies and the increasing capabilities of electronic devices are driving an evolution towards ubiquitous services to mobile users. Wireless networks become increasingly interoperable with each other and with the high-speed wired networks. This reflects a paradigm shift towards new generations of mobile networks where seamless mobility across heterogeneous networks becomes fundamental. This generation is referred to as fourth generation (4G). 4G wireless networks is envisioned as a convergence of different wireless access technologies providing the user with the best anywhere, anytime connection and improving the system resource utilization. With the advent of new value-added services (video-conference, multimedia streaming, etc.) and novel concepts introduced into Long Term Evolution (LTE) architecture of the 4th Generation (4G) networks, provisioning efficient mobility management with quality of service guarantees and seamless handoff feature become even more important for next-generation wireless network design. Vertical handover, a term used to indicate the handover between two access nodes of two different technologies, is an issue in heterogeneous networks since each technology has its own mobility management solution. Generally, multimedia applications, one of main services in 4G networks, require a short handover latency, low jitter and minimal packet loss. Handover is required to be achieved seamlessly to enable the users want to have a continuous and qualified service regardless of which access technology they have connected. The aim of this work is to present research outcomes including an analysis of UMTS/WLAN integration and the performance of common applications. The work included the development of a model and simulation environment that could be used to gain results suitable for analysis. Specific attention was paid to design tight coupling and loose coupling architectures as this work direction taken was to identify an architecture that can provide better overall performance and flexible interworking. Our results show that tight and loose coupling have advantages depending on the application. For video conference loose coupling provides lower jitter and end to end delay. Tight coupling was found to provide a lower response time for an http page application. Tight coupling was also provides a lower response time for ftp file uploads however to download ftp files loose coupling provides a lower response time.

KEYWORDS: 4G Network, Vertical, Handover, Wireless, Seamless